CPG Supplemental Responses to Additional Comments on the Baseline Human Health Risk Assessment for the LPRSA Received From EPA Region 2 on July 15, 2015

This document presents CPG's supplemental responses to additional written comments on the 17-mile BHHRA provided by EPA Region 2 on July 15, 2015. Each of EPA Region 2's July 15, 2015 comment is presented below, followed by the CPG's response.

Comment 42 (raised by CPG during 6/24/2015 technical call)

EPA has reviewed the summary report on the CAS submitted by the CPG with its FFS comments and cannot reproduce the results. More information is needed in order to fully understand what the CPG did and determine if EPA thinks it is appropriate. In particular, EPA is concerned with the weighting approach used by the CPG to interpret the raw data (see Comment 127c). In addition, EPA may have concerns with the underlying approach used to gather the data. Any reference to the CPG's CAS should include the caveat that there is uncertainty with the findings of the CAS and that the results are not definitive.

Some examples of places where the discussion of the CAS go beyond anecdotal to interpretation are:

- Page 7-13 – says the CPG CAS supports a lower fish consumption rate.
- Page 7-14 – implies the CAS supports a lower crab consumption rate.
- Page 7-17 – says the CPG CAS supports a higher bodyweight
- Page 7-18 – the footnote on this page
- Page 7-38 – report says that the CAS shows that pregnant women are not consuming fish from the LPRSA

References to the CAS such as these should either be removed from the report or additional language should be added to the references stating that these statements are uncertain and unconfirmed.

CPG Response to EPA Additional Information on Comment 42 – The text will be revised to note that the findings of the CPG's CAS have not been confirmed by Region 2 (see response to comments 42 and 127). The discussion of angler body weight will be removed (see response to comment 133); footnote 46 on page 7-18 will be removed (see response to comment 135); and the statement regarding pregnant and nursing women on p. 7-38 will be removed. Please also see the Attachment to this supplemental RTC document, which identifies places in the BHHRA report where the CPG's CAS is discussed and where this information can be found in the CPG's CAS Data Report, which was provided to Region 2 in August 2014.

Comment 44 (raised by CPG during 6/24/2015 technical call)

The report currently focuses exclusively on the accessible sediment and generally ignores the rest of the river. The LPRSA is a dynamic environment where sediment moves and concentrations at any particular location likely change over time. In addition, fish and benthic species are exposed to more than just the accessible sediment. A brief discussion of what the whole LPRSA looks like should be included, with reference to both the RI report and the BERA (for fish concentrations) for more information. This comment goes beyond just the identification of potential hot spots.

CPG Response to EPA Additional Information on Comment 44 – The report does not ignore the rest of the river and the impacts of contamination throughout the river are implicit in the contaminant levels in fish and crab tissue, which are used to evaluate consumption risk. The focus on accessible sediment is limited

to the evaluation of direct contact exposure pathways in the BHHRA as laid out in the Region 2-approved PFD as well as RAGS guidance (EPA 1989, 2004), which recommends that surficial nearshore sediment should be the focus of the evaluation of direct contact with sediment. Per Region 2's original Comment 44, CPG will include in the uncertainty evaluation a discussion of the concentrations of key COPCs in nearby sediment samples that are not identified as accessible to address the Region's comment regarding hot spots. However, a discussion of the whole LPRSA system does not belong in the BHHRA, and this topic is addressed in detail in the 17-mile LPRSA RI report (AQEA et al., in prep). A statement will be added to the text that references the reader to the RI for more information on the LPRSA system.

The comment includes the incorrect assertion by the Region that contaminant concentrations (presumably over the top 6 inches of sediment) at any particular location likely change over time. At most locations, changes only occur slowly over annual to decadal time frames. Concentrations can change more quickly only at the minor subset of locations subject to significant erosion and deposition during extreme flow events.

Comment 46 (raised by CPG on its 6/12/2015 letter and discussed during 6/15/2015 and 7/15/2015 technical calls)

We have already discussed the co-eluting PCB issue. To help explain our additional concerns, we offer the following example:

For accessible sediment, the report says that 143 samples were included in the EPC calculations, and Table A-1 of Appendix A gives a sample count by sample event that results in a total of 143 samples. However, Table A-4 includes the analytical data for 149 accessible sediment samples, Table 3-2 in the text of the report includes 292 accessible sediment samples, and portions of Figure 3-1 are very difficult to read. This is confusing and the reader should not have to rely on a figure to identify the specific list of 143 samples.

In addition, none of these tables or figures break out the data into the 3-mile segments that are used to refine the sediment analysis in the BHHRA. While Table A-4 does identify each sample's stream mile, the samples are not sorted by stream mile, so attempting to identify the samples in each 3-mile segment in this 133 page table (that includes 149 samples) is laborious at best and should not be required of the reader.

Clarification of which sediment samples were used in which EPC calculations could be as simple as adding a column or two to the list of samples in Table 3-2.

CPG Response to EPA Additional Information on Comment 46

The text will be clarified to indicate that all of the samples listed in the sample tables, including Table 3-2 were included in the calculation of maximum detections for COPC screening and in EPC development. For accessible surface sediment, the text calls out a total of 143 samples – the word "samples" will be replaced by the word "locations", and will clarify that at each of those locations, separate samples were collected for various parameters, such that the total number of discrete samples presented in Table 3-2 is greater than 143. However, since each sample was not analyzed for all parameters, there are a maximum of 143 samples (and 6 duplicates) for any given parameter (which matches the total number of samples for dioxin and PCB congeners in Table A-4). The number of locations versus samples listed the text and tables will be updated and verified once the SSP2 data are included.

As discussed on the 7/15/2015 call, the tables and figures will be revised to sort and break out the

samples by the 3-mile segments used to refine the site-wide sediment analysis (see response to comment 46).

Comments 50 and 87 (raised by CPG during 6/15/2015 technical call)

EPA has heard back from STSC regarding the nanochlor alternative. They are still working on the issue and hope to get back to us soon.

CPG Response to EPA Additional Information on Comments 50 and 87

As of the 7/29/2015 technical call, STSC is still working on the issue.

Comment 130 (raised by CPG during 6/24/2015 technical call)

The CPG questions why it can't include the table and related text in this section, to give the reader some idea of how reducing the amount of fish they eat from the LPRSA will affect risk. We discussed that, if retained, the text and table need to clearly state that this is just an example and is not based on actual data, and that the purpose of the risk assessment is to estimate risks posed to people consuming all of their fish from the site. EPA agreed to discuss this more internally.

One additional issue which was not raised during the 6/24/2015 technical call is that the calculations in the table are based on the assumption that fish from other areas has no contamination. EPA continues to take the position that this table is unnecessary and inappropriate for inclusion in the baseline risk assessment.

CPG Response to EPA Additional Information on Comment 130

As discussed during the 6/24/2015 call, the text already states that the table presents an example of the effect of changing FI on crab consumption risk for the LPRSA. However, the text will be reviewed and revised, if necessary, to make clear that the alternate FI values presented in the table are examples (see response to comment 130).

Regarding EPA's additional issue not raised during the 6/24/15 call, CPG disagrees that the assumption of whether fish or crab from other areas have contamination has any bearing on the calculation of baseline risk for the LPRSA. Further, this comment is inconsistent with Region 2's request to change the title of the section to "Fraction from Source for Crab Ingestion" (Comment 130), which indicates that the parameter applies to consumption of crab from the LPRSA. This comment is also inconsistent with Region 2's request to remove the section of the report (Section 6.5.3) that identifies other sources of background risk, such as chemicals in the diet from market-basket foodstuffs (Comment 114). The CPG stands by its original position on this matter and will not remove this text from the revised BHHRA.

Comment 142 (raised by CPG during 6/24/2015 technical call)

This issue goes beyond just including uncertainty about potential degradation of some COPCs, and relates to our response to Comment 44. The LPRSA is a dynamic system. Concentrations in the accessible sediment may increase or decrease over time. Some chemicals may degrade over time, or they may transform to forms with higher or lower toxicity. Sediment with high concentrations of COPCs may become buried due to deposition, or may become exposed due to erosion. There is uncertainty related to these issues, but the overall directionality of that uncertainty is unknown.

If the CPG wants to include this type of information in the uncertainty section, then the discussion must be balanced. If retained, we suggest renaming this section "Assumption of Static Conditions" and making clear that the risk assessment may over or underestimate risk due to the dynamic nature of the river, or it may overestimate risks in one area or due to one contaminant, but underestimate them in another situation, at any given point in time.

CPG Response to EPA Additional Information on Comment 142

The additional information provided by Region 2 in response to CPG's question goes beyond presenting a brief and simple discussion of environmental degradation processes that can impact long-term exposure point concentrations to discussing the complexity and uncertainty in the LPRSA system and sediment transport processes. The additional information requested goes beyond the scope of the BHHRA and is addressed in the RI. The CPG will replace the last sentence of the section with a statement that refers the reader to the RI for more information (see response to comment 142).

Comments 145 and 146 (raised by CPG during 6/24/2015 technical call)

These issues are very complicated, and including the amount of information in the report that the CPG did just touches at the surface. In addition, the studies that the report cites are one-sided. For example, the Mayes study regarding dermal absorption, which was done for the Housatonic, shows that absorption could be significantly underestimated for PCBs.

The agency has looked at these issues thoroughly and has not recommended adjustments to the numbers because of methodological issues with the study. If retained, the discussion must be expanded to include studies that show different findings. The results must be clearly caveated and also reference EPA's review of the documents and its conclusions. Conclusory statements, such as that made on Page 7-31 that absorption may be overestimated by 3 to 70%, cannot be made.

CPG Response to EPA Additional Information on Comments 145 and 146

The text will be revised to note EPA's comments regarding the Mayes study. The statement summarizing the range of 3 to 70% will be removed. See response to comments 144, 145 and 146. Furthermore, the CPG notes that in many instances the Region's comments are "one-sided" and promote an extreme and unrealistic characterization of human health risk in the LPRSA well beyond what can be considered as a reasonable maximum exposure.

Comment 175 (raised by CPG during 6/15/2015 technical call)

EPA reviewed the iron data and found that, while concentrations are above screening values, the non-cancer health hazards posed by iron remain below an HI of 1. This should be noted in the report where iron is designated as an essential nutrient, but it can continue to be treated as an essential nutrient.

CPG Response to EPA Additional Information on Comments 175

The text will be revised to note that iron exceeded its screening value, but was not retained as a COPC because it is an essential nutrient, consistent with the Region 2-approved PFD.

CPG Supplemental Responses to Additional Comments on the Baseline Human Health Risk Assessment for the LPRSA Received From EPA Region 2 on July 15, 2015

ATTACHMENT

This attachment to CPG's Supplemental Responses to Additional Comments addresses Region 2 comments on the CPG's Creel/Angler Survey (CAS), including Comments 42, 127c, 133, 135, 137 dated June 5, 2015 and Additional Comments dated July 15, 2015. The attachment presents where the findings of the CPG's CAS cited in the BHHRA report are found in the *CAS Data Report (*shown parenthetically in bold italics below). Please note that for a few parameters (response rate, race, age) there are slight differences between the two documents in the statistics reported, as a result of finalizing statistics for the *CAS Data Report* published in August 2014, and these are noted below. The revised BHHRA will be updated to reflect the final statistics, and the citation to the *Data Report* will be changed from AECOM [in prep]-c to AECOM 2014. Please also refer to CPG's responses to the June 5, 2015 comments, which were submitted to Region 2 on August 21, 2015, for additional details on revisions to discussion of CAS findings in the BHHRA text.

Pages 2-7 and 2-8 of BHHRA (Comment 42)

The CPG conducted a CAS of the entire LPRSA from September 16, 2011 to September 15, 2012 (AECOM 2011a). The data collection components included on-site intercepts on 136 sample days and angler counts on 164 sample days *(**Sections 2.2 and 2.3**)*. The majority of angling activity was observed between April and October *(**Figure 5.4**),* with most activity above RM 9 (***Figure 5.6***). A total of 381 angler interviews were completed (***Table 5-5***), with an estimated 294 unique anglers (***Section 5.3.1***). A summary of the CPG's CAS is provided below in Section 2.3.1.1.

2.3.1.1 CPG's Creel/Angler Survey of the LPRSA

Over a year-long period in 2011 and 2012, the CPG conducted a CAS in the LPRSA to collect site-specific data on anglers who fish and/or crab in the 17.4 mile Study Area, including information on trips and locations fished, the amount and types of fish and/or crabs caught and kept, preparation and consumption practices, demographic characteristics, advisory awareness and behaviors, and years of fishing the LPRSA. The survey design and administration methods are described in a work plan (AECOM 2011a), which was peer reviewed by an independent panel of experts convened by Toxicology and Excellence in Risk Assessment (TERA).

During the period of the CAS administration (September 16, 2011 to September 15, 2012), survey personnel completed angler intercepts on 136 sample days and angler observations on 164 sample days (***Sections 2.2 and 2.3***). Stratified random sampling was used to allocate sample days by season, type of day, and time of day. Angler intercepts were conducted every month except December, January, and February; angler observations (counts) were conducted every month of the survey year. While the counts provided information on the number and locations of anglers in the Study Area on a sample day, the angler intercepts provided detailed information on angler demographics, trip taking, fishing behaviors, and consumption preferences. Interviewed anglers were asked about their catch, including what was kept/not kept, and why.

The angler counts were conducted by boat between RM 0 and 15, and by land between RM 15 and 17.4 (***Section 2.2***). Over a total of 164 sample days, approximately 1800 unique anglers were observed in the Study Area (***Section 5.2***). Most were fishing at sites above RM 9 (***Figure 5-6***). One popular site located along a bulkhead on the western bank south of the Union Avenue Bridge (~RM 12.8) accounted for approximately 25% of angler observations (***Section 5.2, page 5-6***). Other popular sites included Dundee Dam area, Nutley Boat Launch (RM 10.4) and VFW Park/Firehouse Boat Launch (RM 9.1). On 136 sample days, anglers were intercepted and interviewed about their fishing and crabbing practices, catch and consumption, advisory awareness and behaviors, and demographics. A total of 381 angler interviews were completed, with a response rate of ~74% (minus anglers who refused re-interviews) (***Table 5-5, shows final statistic of***

72.2%). Basic information (e.g., gender, estimated race, age, whether angler kept fish) was recorded for anglers who refused interviews ("Missed Creel Reports").

Of the estimated 294 unique anglers who were interviewed (***Section 5.3.1, page 5-13***), approximately 57% were White, 23% Hispanic, 12% African American, 2% Asian, and 1% American Indian (5% Other or Refused) (***Figure 5-12, shows final breakdown of White 58%, Hispanic 24%, and Other/Refused 3%, with other race percentages the same***). The vast majority of anglers were male (~95%) (***Figure 5-11 average of interviews and MCRs***), and the median age was 40 (***Table 5-7, shows median is 39 and mean is 40.6***). Most lived within 5 miles of the LPRSA (***Figure 5-15***) and fished between April and October (***Figure 5-4***). About two-thirds of non-consuming anglers reported awareness of the LPRSA "Do Not Eat" consumption advisory; about one-third of consuming anglers reported awareness (***Text at top of page 5-30***).

The CAS found that most LPRSA anglers practiced 'catch and release' fishing techniques; less than 10% reported consuming LPRSA fish (25 anglers kept fish or reported consuming LPRSA fish) (***Section 5.3.2***) Species that anglers kept or reported they would keep included striped bass, common carp, channel catfish, white perch, smallmouth and largemouth bass, northern pike, American eel, and brown bullhead (***Section 5.3.3***). Frying was the cooking method of choice (***Table 5-12***). While some anglers planned to share their catch with one other person, none reported sharing with children or pregnant or nursing women (***Table 5-12***). Only three of the anglers who were interviewed reported they crab in the LPRSA (***Section 5.3***), and only one of the three reported that he consumes LPRSA crab if caught (***Section 5.5***). On the day interviewed, no anglers had any crabs in their possession (***Table 5-12, which does not include crab***). The objectives, methods, and results of the CPG's CAS are summarized in a data report (AECOM [in prep]-c), and data analysis is ongoing.

<u>Page 7-11 of BHHRA, fourth bullet (no specific comment, falls under #42)</u>

There is uncertainty in using consumption rates based on the Newark Bay fishery for the LPRSA. Newark Bay is a large coastal estuary located along the Mid-Atlantic Bight, and serves as a spawning ground, migratory pathway, and nursery/foraging area for a variety of estuarine, marine, and anadromous fish species. Some of the species found in Newark Bay, including summer and winter flounder, bluefish, and tomcod (U.S. Fish and Wildlife Service 1997, Woodhead 1991), are not abundant in the LPRSA (Windward 2010d, 2011). The CPG's 2011-2012 CAS of the LPRSA found that most fishing occurs in the freshwater part of the river (above river mile 9) (AECOM [in prep]-c) (***Figure 5-6 of CAS Data Report***), which does not resemble Newark Bay in terms of salinity or species. To the extent Newark Bay anglers were targeting species that are not abundant in the LPRSA, the representativeness of the Burger (2002) consumption rates decreases.

<u>Page 7-13 of BHHRA, second paragraph, first sentence (Comment 127c and Additional Comment provided July 15, 2015)</u>

Fish consumption rates in the range represented by these three alternatives (3-20 g/day), which are supported by the CPG's CAS, are more realistic estimates of daily intake of fish for LPRSA anglers than the RME rate used in the BHHRA.

Note: The calculation of fish consumption rate based on the CPG's CAS is documented in the CPG's Site-Specific Human Health Risk Assessment of the LPRSA, which was included as Attachment B of CPG's Comments on the Revised FFS submitted to EPA in August 2014. Per response to comment 127c, the BHHRA text will be revised to note that the findings of the CPG's CAS have not been confirmed by Region 2.

CPG Supplemental Responses to Additional Comments on the Baseline Human Health Risk Assessment for the LPRSA Received From EPA Region 2 on July 15, 2015

Page 7-13 and 7-14 of BHHRA, Fraction Ingested for Fish (Comment 129)

There is uncertainty in the assumption that 100% of the recreational angler's fish consumption comes from the LPRSA for both the RME and CTE scenarios for fish and crab consumption (fraction ingested (FI) of 1). Based on the 2011-2012 CAS, slightly more than half of the anglers who were interviewed (including slightly more than half of interviewed anglers who reported consuming LPRSA fish or kept LPRSA fish for consumption) reported fishing at locations other than the LPRSA in the month prior to the interview month (***Section 5.3.5 of CAS Data Report***). The consumers of LPRSA fish reported taking one to as many as ten trips outside the Study Area in the month prior to the interview month. The assumption that all of the angler's catch comes from the LPRSA likely overestimates risk from fish consumption for many of the LPRSA anglers.

Note: See response to comment 129 for CPG's responses to Region 2 comments on this paragraph.

Page 7-14 of BHHRA, Crab Consumption Rate, second paragraph (no specific comment, falls under #42 and Additional Comment Provided July 15, 2015)

Of the nearly 300 anglers interviewed during the CPG's year-long CAS, only three reported crabbing in the LPRSA, in addition to fishing (AECOM [in prep]-c) (***Section 5.3 of CAS Data Report***). Only one of the three intercepted anglers reported consuming LPRSA crab (***Section 5.5 of CAS Data Report***), and no intercepted anglers had crab in their possession at the time of their interview (***Table 5-12, Summary of Kept Catch, which does not include crab***).

Page 7-17 of BHHRA, Angler Body Weight (Comment 133 and Additional Comment Provided July 15, 2015)

In addition, the preliminary analysis of self-reported body weight of anglers who were interviewed in the CPG's 2011-2012 CAS indicates a mean body weight of 80 kg (***Section 5.3.1 of CAS Data Report, Body Weight***).

Note: Per response to comment 133, the discussion of angler body weight of 80 kg will be removed from the BHHRA, as the EPA's updated adult body weight of 80 kg will be used in the revised risk calculations.

Page 7-18, Footnote 46 (Comment 135 and Additional Comment Provided July 15, 2015)

Only about 1% of anglers interviewed in the CPG's 2011-2012 CAS reported fishing and crabbing in the LPRSA, and only one of the three reported that he consumes LPRSA crab. ***(Sections 5.3 and 5.5 of CAS Data Report***).

Note: Per response to comment 135, footnote 46 will be removed.

Page 7-19 of BHHRA, Section 7.2.1.5, Consumption of Other Biota, second paragraph (Comment 137)

During the CPG's 2011-2012 CAS, no individuals were observed leaving the LPRSA with any waterfowl or amphibians. One Hispanic angler was observed leaving with a turtle (species unknown), but it is not known whether it was for consumption (this angler was interviewed on other occasions and reported he might keep and eat LPRSA fish if there was no advisory). One African American angler who was interviewed reported catching a snapping turtle, but not keeping it (this angler reported not consuming LPRSA fish or crab). While it is possible that some anglers may keep turtles for consumption, the available data, while limited, suggest this is not a significant route of potential exposure. Thus, it is unlikely that site risks have been underestimated by not quantitatively evaluating consumption of LPRSA biota other than fish and crab.

CPG Supplemental Responses to Additional Comments on the Baseline Human Health Risk Assessment for the LPRSA Received From EPA Region 2 on July 15, 2015

Note: Consumption of other biota is not discussed in the CAS Data Report. Per response to comment 137, the second paragraph of Section 7.2.1.5 will be revised as requested.

Page 7-38 of BHHRA, Section 7.3.4, Potential Contribution from Early-life Exposures to Lifetime Risk, second paragraph (no specific comment, falls under #42 and Additional Comment provided July 15, 2015)

For pre-conception and in utero life stages, exposure to bioaccumulative COPCs, such as dioxins and PCBs, would be primarily through the mother's diet, as would exposure of nursing infants. If women of childbearing age, pregnant, or breastfeeding mothers consume large amounts of LPRSA fish or crabs, they could expose the unborn child or nursing infant to lipophilic COPCs and/or bioaccumulative COPCs (e.g., dioxin, PCBs, and mercury). It should be noted that the CPG's 2011-2012 CAS of the LPRSA found few women anglers (<5%) (***Figure 5-11 of CAS Data Report***), and none reported consuming their catch (***Section 5.3.2 of CAS Data Report***) (AECOM [in prep-c]). In addition, none of the anglers who kept catch reported they planned to share the catch with pregnant or nursing women (***Table 5-12 of CAS Data Report***). That being said, the CPG's CAS also found that anglers who reported consuming LPRSA catch generally had lower awareness of the "Do Not Eat" consumption advisory (in place since the 1980s) than anglers who reported they did not consume their LPRSA catch (***Text at top of page 5-30***) (AECOM [in prep-c]). Thus, while there is uncertainty in the extent of early life exposures, the available data suggest that in utero and infant exposures to bioaccumulative COPCs via the mother's consumption of LPRSA fish and crab are not contributing appreciably to lifetime risk.

Note: Per CPG's responses to Region 2's additional comments provided on July 15, 2015, the statement regarding pregnant and nursing women will be removed.